AN OBSERVATION ON THE STOLON FORMATION OF A BRYOZOAN, BUGULA NERITINA LINNE

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AN OBSERVATION ON THE STOLON FORMATION OF A BRYOZOAN, *BUGULA NERITINA* LINNÉ[1)]

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According to Mawatari (1951), in southern Japan large colonies of *Bugula neritina* are torn to shreds by the winter stroms, and only the smaller and younger ones are seen in spring, remaining inactive. They begin to grow by asexual reproducation of the colony itself in March with the rise of temperature. Previously, on the other hand, it was reported that along the shore near the Station the colonies of this species disappeared at the beginning of winter, but the stolons with indefinite from and size remained alive in a resting state (Numakunai, 1960).

Added to the stolon formation in winter, by the observation of the colony formation in the field, it was found that even the young colonies began to form the stolons from late spring to early summer, and this continued till late summer. This was confirmed again by the observations of the colony formation from the stolons on the test pieces to which the larvae attached in the previous summer. In this paper the outline of the stolon formation of this species in the warm season will be described.

The stolons attached to the test pieces formed the new young colonies almost as in the field. In the middle of December active colonies almost disappeared, and only the stolons which attached to the substratum could be seen. These stolons were inactive for four months during the winter. In late April several pigment masses which were blackish brown in color appeared at places on a stolon. These pigment masses turned to small processes and the primary zooid was produced in the area in a few days. In late May young colonies were visible, and, on the other hand, in some other stolons the beginning of budding could be observed. Also in some other stolons, moreover, no indication of budding could be seen. In the course of colony formation the bifurcation began in the early stage of the second or the third zooid. The small pigment masses, as were observed in

1) Contributions from the Marine Biological Station of Asamushi, Aomori Ken, No. 293.

the budding from the stolon, could be observed on the dorsal side of the zooid at the bifurcation (Fig. 1). This is the first indication of the stolon formation. From these masses small processes appeared and they became longer day after day, and adhered to the substratum. The newly formed stolons were transparent except for the growing ends with distinct pigment (Figs. 2 and 3).

From the end of May to early June the young colonies were found to have their stolons moderately developed (Figs. 4 and 5). In late June some colonies consisted of zooids with ovicells, and the liberation of larvae began from the middle of July. The stolon formation proceeded in parallel with the colony formation and sexual maturation. The transparent stolons became opaque, perhaps, on account of the accumulation of nourishing substance, as the stolons elongated. After becoming opaque, the stolons became brown in color, stopped their growth, and then the pigment at the growing end disappeared.

The bifurcation occurred in the stolon formation too, and some times the stolons became irregularly divided into three or four at the point of growing tips to form various forms (Fig. 5). From the middle of August to September the stolons which developed fully could be seen at the proximal part of the colonies, and at the apical part, at the newly formed branches, those which were in the stage of beginning of appearance were visible. The stolons were formed invariably at the points of bifurcation of the colonies, though they were not uniform in size and form. Already in the middle of August, some of them gave rise to the zooids from the pigment masses, as were visible in the stolons in winter. Some stolons, somewhat transprent, were visible, but they could form the zooids in the normal process.

The life-cycle of *Bugula neritina* has never been investigated fully. According to the present writer's investigations, the stolons are produced from the colony of the species in winter and in summer in the vicinity of the Station. This fact shows one of the new asexual reproductive type of this species in the life-cycle.

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PLATE IV

Process of stolon formation of *Bugula neritina*.

Fig. 1. Beginning of the stolon formation at the bifuraction. ca. × 25.

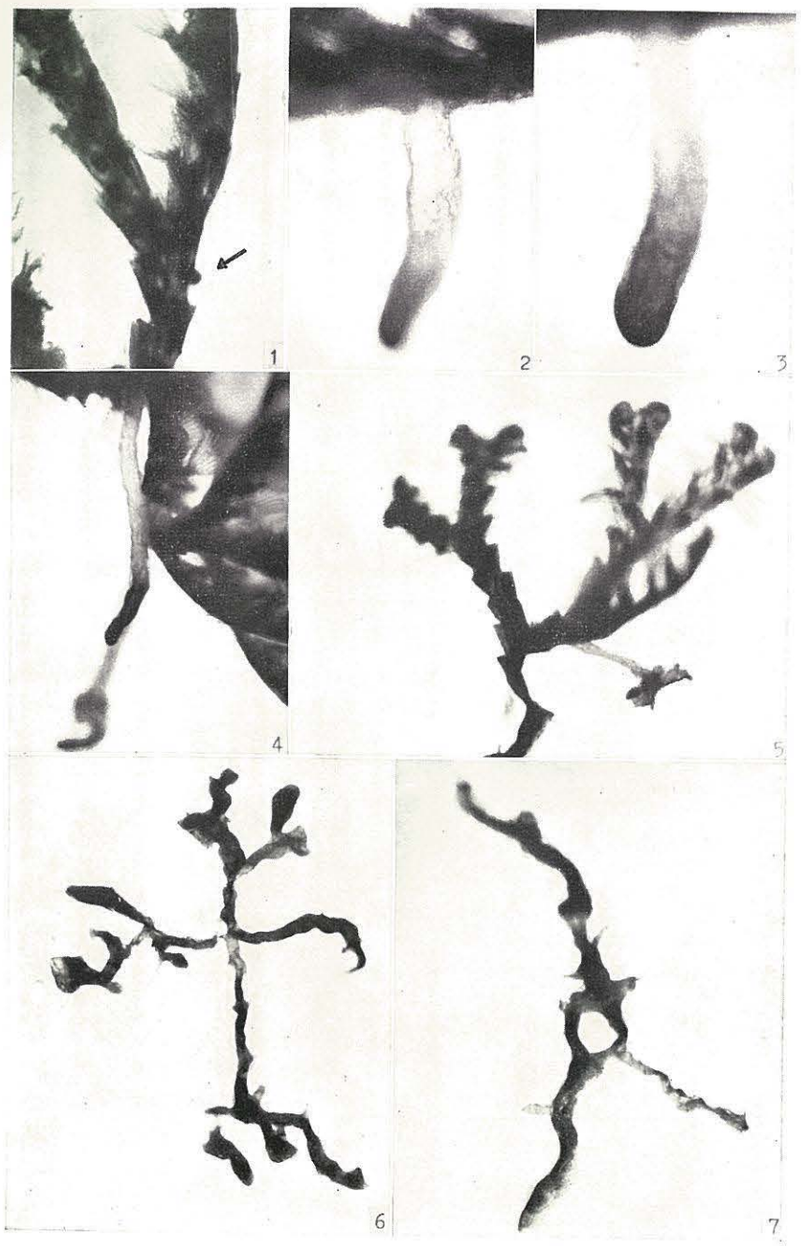
Fig. 2. A newly formed stolon. ca. × 35.

Fig. 3. The distinct pigment at the growing tip of a new stolon. ca. × 40.

Fig. 4. A stolon elongated moderately. ca. × 10.

Fig. 5. A solon with tips which bifurcated irregularly. ca. × 10.

Figs. 6 and 7. The completed stolons which show various forms. ca. × 3, × 4.



Numakunai, T: Stolon formation of *Bugula neritina*